



NEW IDEAS FOR THE MILLENNIUM



G A L O R A T H

DCMC Pricing and Negotiation Conference

**“Paying The Right Price” Through
Parametric Estimation Modeling**

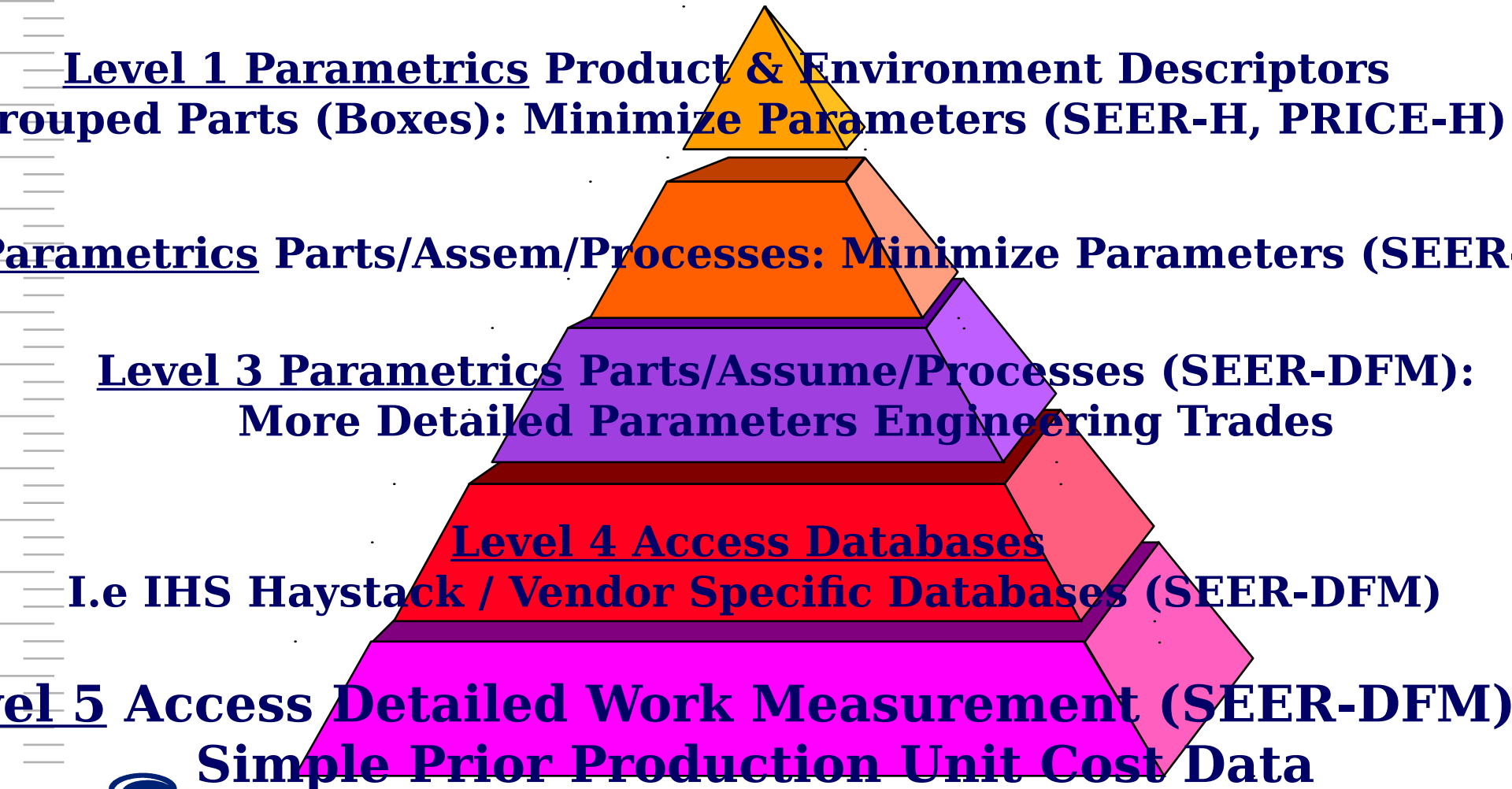
Dan Galorath, June 2000



Two Kinds of Parametrics Models

- **Macro level Parametrics (SEER-H, PRICE-H)**
 - Estimates Based On High Level Information Such As Weight, Boards, Etc.
 - Quicker than Manual Methods
 - **Able To Estimate Without Cost Data**
 - Development, Production, Logistics, Operations, & Support All Handled In One Model (SEER-H)
 - Can Be Calibrated Against Actuals
- **Detailed Level Parametrics (SEER-DFM)**
 - To Understand “Should Cost” Tradeoffs & Potential Reductions
 - **Models Specific Manufacturing Issues**
 - Details Including Specific Assembly Issues, Specific Materials, Process Selection, etc. (Insertion Methods)
 - Often Called Bottoms Up Parametrics
 - Cost Based On The Work That Must Be Performed
 - Cost Tradeoffs Based On Very Specific Manufacturing Issues (These Cannot Be Fully Understood By Calibration of Macro Level “H” Models)
 - Much More Rapid Piece Parts Quotes From Subs
 - Repeatable

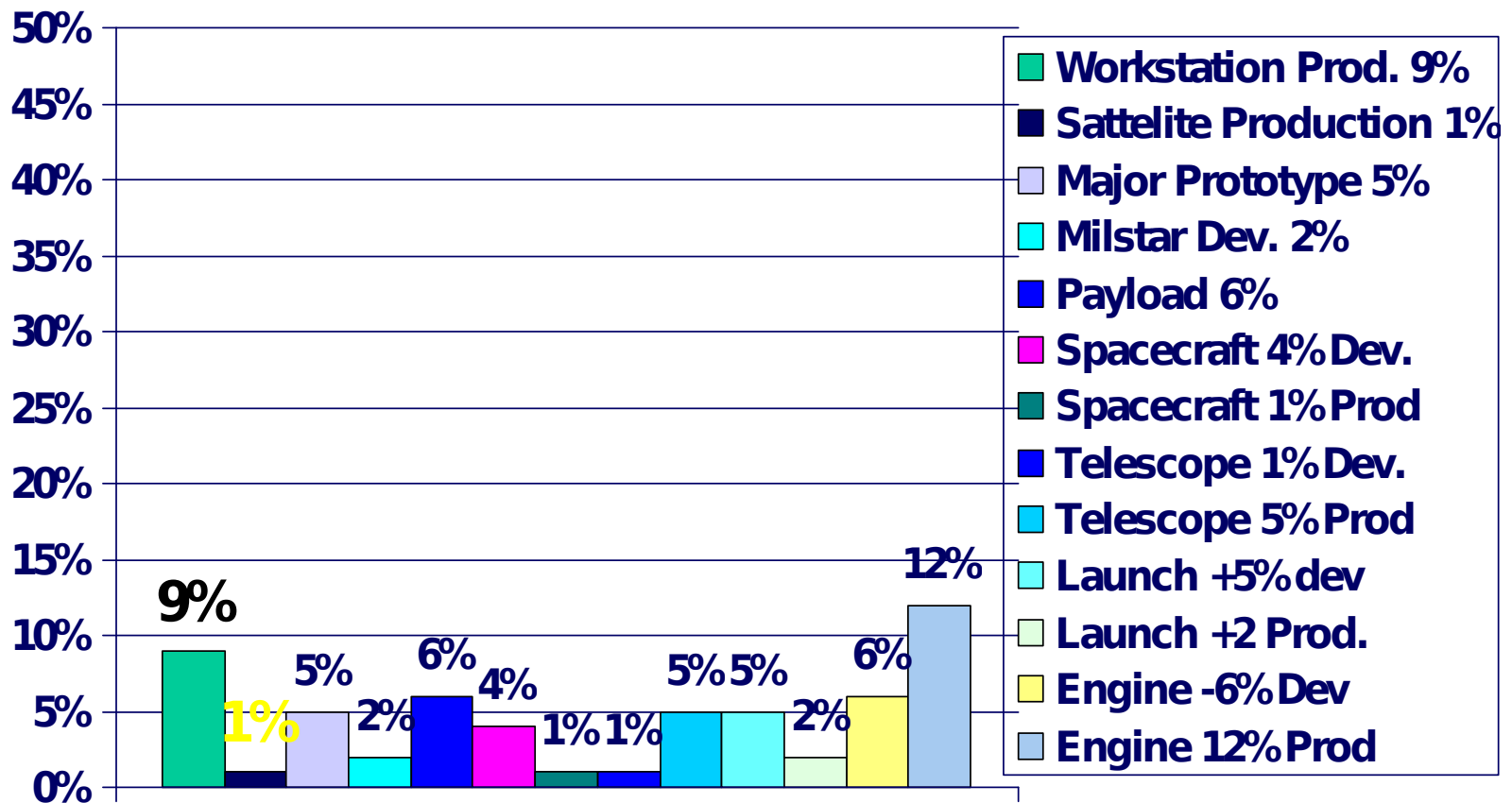
Cost Model Input Parameter Granularity Must Address Estimating Requirements



Parametrics As A Basis Of Negotiation Example

- **Buying Organization's Estimate Was \$130,000 Less Than Bid For A Part**
- **Contractor Was Asked To Justify the Cost Difference**
- **Contractor Was Unable To Do So**
- **Result... \$130,000 Reduction In Price**
- **Why Did This Work**
 - Buying Organization Had Experience With SEER Model
 - Found Accurate In Estimating
 - Buying Organization Was Able To Model Part Specific Characteristics
 - The Buyer and Supplier Were Able To View The Problem In Terms Of Its Characteristics

SEER-H Provides Accurate System Estimates



Should Cost Tradeoffs Must Account For Risk & Uncertainty

+ PRODUCT DESCRIPTION

- Material Origin	Sand Casting		
- Production Quantity	2,000		
- Quantity Per Next Higher Assembly	1		
- Hourly Labor Rate	54.00		
- Production Experience/Optimization	Low	Hi	EHi
- Manufacturing Environment	Consumer		
- Material Selection	Grey Cast Irons		
- Raw Sandcast Part Cost (Optional)	0.0000		
- Finished Weight (lb)	300.0000	340.0000	380.0000
- Shape	Irregular Cross Section		
- Dimensions (in)	0.000	0.000	

+ OPERATIONS

- Mill Locating Pad (Radial Mill Rough)		
- Rough Front Mtg. Flg (End Mill Rough)		
- Finish Front Mtg Flg (End Mill Finish)	0.0100	0.00
- Drill Mtg Holes (Drill)	7	0.7500
- Tap Mtg Holes (Tap)	7	
- Bore Pilot Hole (Bore Finish)	0.0050	0.00
- Drill Holes (Drill)	19	1.2500
- Tap Holes (Tap)	11	
- Ream Holes (Ream)	8	
- Operation (Next)		

+ MANUFACTURING DESCRIPTION

- Tooling Type	Hi	Hi
- Tooling Complexity	Low	Low
- Machine Tool Condition	Nom	Nom

+ OPTIONAL COST INPUTS

- Tooling Cost (Optional)	2,500.00
- Tooling Amort. Quantity (Optional)	5,000
- Other Cost (Optional)	700.00

+ LABOR CALIBRATION

- Start Learning (Optional)	1.00
- Stop Learning (Optional)	10,000
- PROBABILITY (RISK)	0
	50.00%



Macro Level “H” Models Vs Part Specific Model

One Boeing Seattle Prospective

- **Boeing Seattle Finds Using Both “H” Models And SEER-DFM They Get The Full Cost Picture and Save The Government Money**
- **Macro Level H Models Start With High level Information Such As Weight and General Material Type**
 - Output Cost, Labor, Materials, O&S Costs
 - Even With Calibration, Macro Level “H” Models Can’t Do The Detailed Engineering/Cost Tradeoffs
- **Use SEER-DFM For Trades & Detailed Analysis**
 - Example: Part Weighed 25 pounds
 - Driving Out 1.5 pounds (Sculpt With Spars) Quadrupled cost
 - SEER-DFM Able To Accurately Model This
 - Answers Questions Such As “How many do you have to produce before a process makes sense?”
 - Macro Level “H” models” Can’t Answer Such Questions Without Infinite Calibrations And Data Often Not Available

DCMC Boeing Seattle Comments On Using The SEER-DFM Parametric Approach:

- **This Is What We Are Looking For. It simplifies The negotiation. The Parameters Define The Part. Easier to negotiate change**
 - SEER-DFM breaks down to detail so both sides think it is fair
 - Works For Simple Manufacturing Processes & Complicated Parts & Processes
 - Using SEER-DFM They Tradeoff Of Specific Materials, Processes, Fasteners, Stiffeners, Assembly, Even That Don't Impact The Weight
 - All Cost Relationship Data Resides in SEER-DFM
- **Government Audits The Parts, Process, Assembly, Specifics, Not \$ Just Per Pound**
- **Tradeoffs Are Performed Based On Specific, Controllable Variables (SEER-DFM Parameters)**

Lessons learned

- **Part of the Process Is To Obtain Buy-In From Both Government and Contractor IN Advance of Use In Negotiation**
- **Use The Right Type of Parametric Model For The Job At Hand**
- **Many Times an “H” Model Will Be Sufficient**
 - When Part Has Been Done Before
 - When There Is No Change In Environment
 - When The Production Issues Are Simple/Expected
 - When Specific Engineering Tradeoffs Are Not Needed
- **Other Times Complex Operations For Parts Will Require A Part/Process/Assembly Model Like SEER-DFM**
 - When The Part Has Unusual Complexity I.E.
 - Specific Assembly Challenges
 - Custom Manufacturing Processes
 - When Should Cost Means Find A Lower Cost